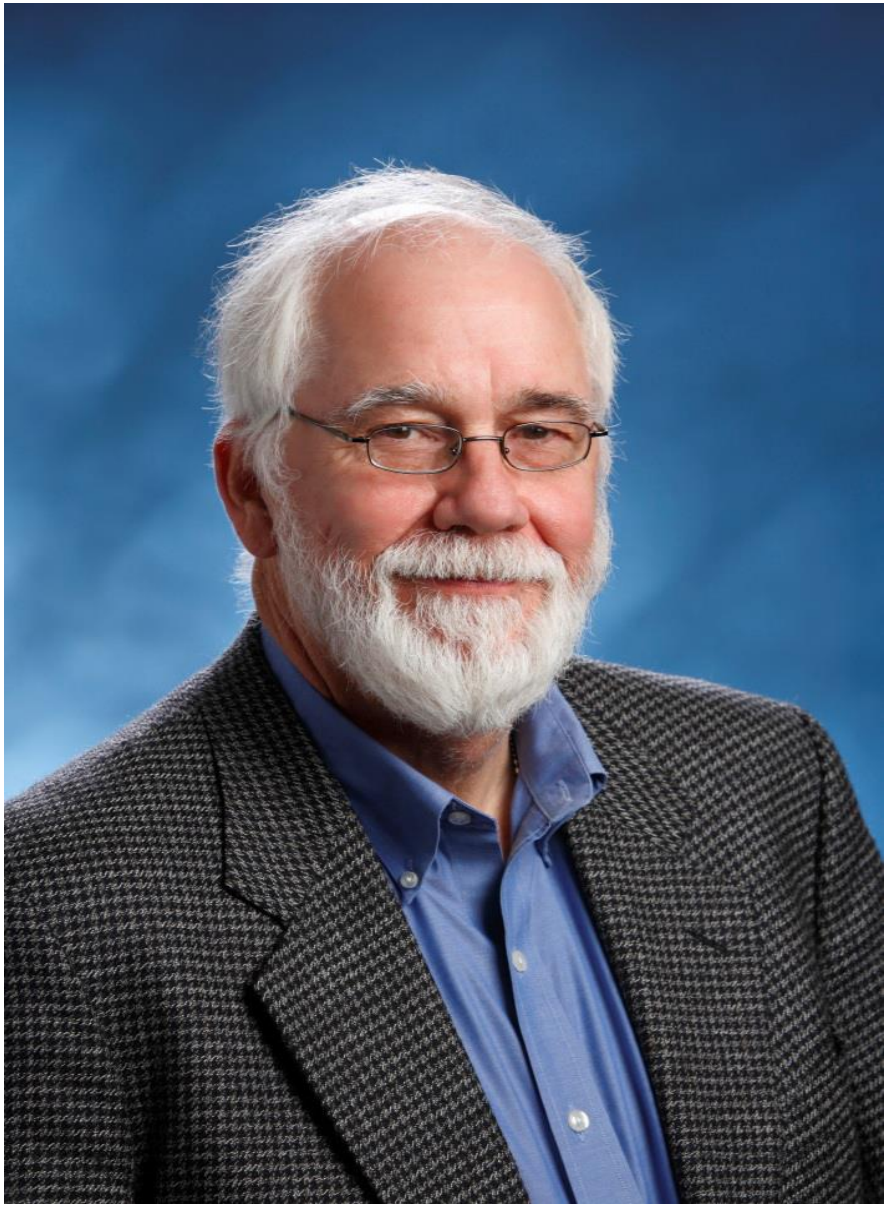
Enabling a Smarter and Safer Nuclear Industry with a Secure, Real-time Data Infrastructure

Presented by Chris Crosby
Global Nuclear Industry Principal

Fukushima Forum
February 18th, 2014
Tokyo, Japan



"Our mission is to maximize the VALUE our customers get from our product and services."

Dr. Patrick Kennedy

"OSIsoft and the PI System exist to make our customers smarter, enabling better decisions."

About OSIsoft

Founded in **1980**

14,000 Sites,
4,000 Customers
123 Countries

Revolutionary **customer support**

Over 20% of revenue invested in R&D

Global presence, offices worldwide

Power & Utilities
Oil & Gas
Chemicals
Metals & Mining

Pharma
Life Sciences
Pulp & Paper
Datacenters
Critical Facilities

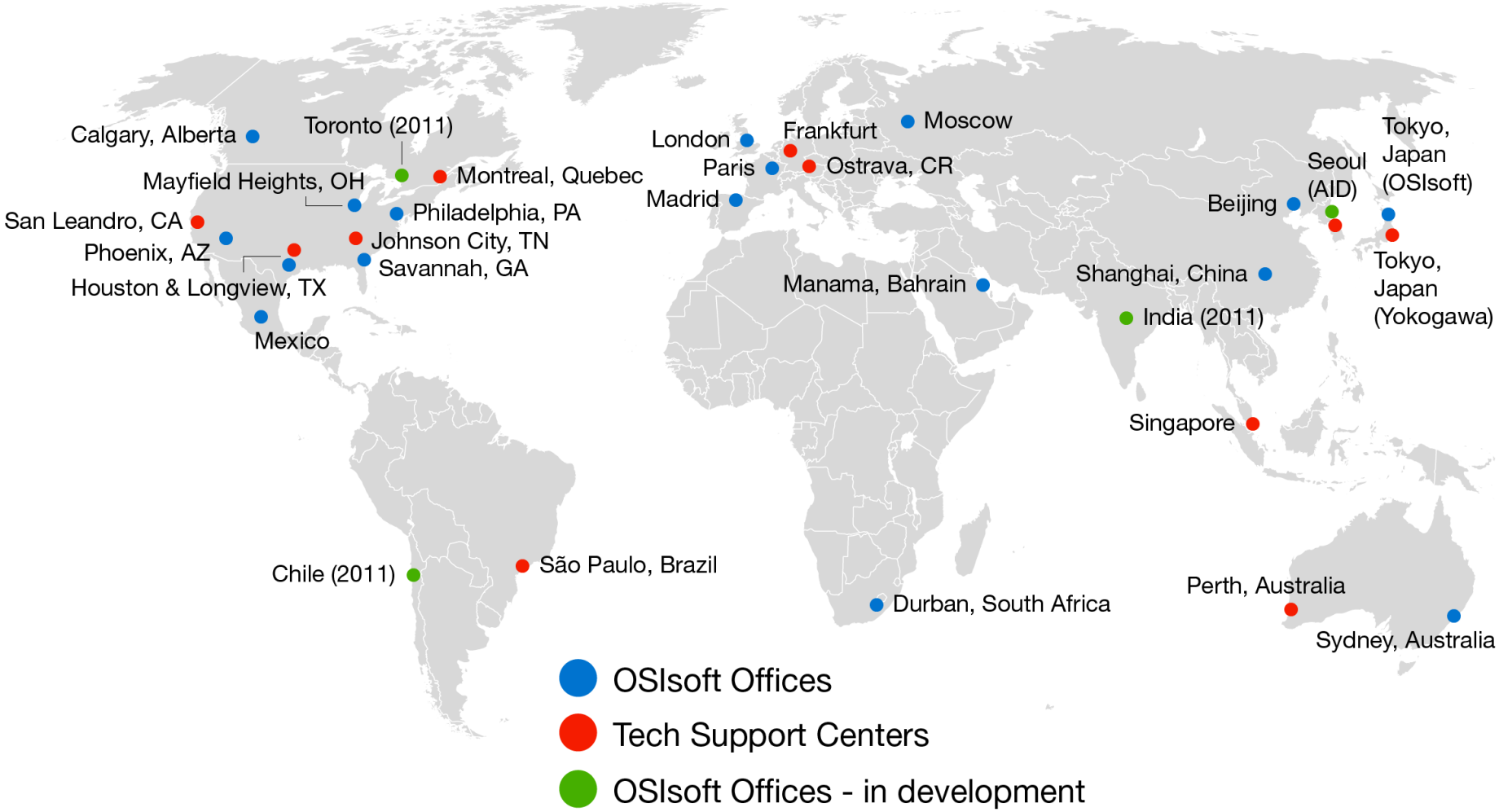
Strategic Partners:
Microsoft, ESRI, Cisco, Accenture, IBM

>1000 Employees

65% of Global 500 process & manufacturing

Market Leader
"Enterprise infrastructure for streaming data & events"

Worldwide Presence of OSIsoft



OSIsoft Japan K.K.

- **Founded** – July 2005
- **President** – Shizuo Itoh
- **Address** – Celestine Shiba Mitsui Bldg. 8F, 3-23-1, Shiba, Minato-ku, Tokyo
- **Employee** – 13 Professionals
  - Customer Support Engineer 7
  - Technical Consultant 1
  - Account Manager 2
  - Administration/Office manager 1
  - Marketing 1
  - Regional Manager 1
- **Experienced**
  - 80 customers, 200 installations
    (Leading companies in Oil, Chemical, Petro chemistry, Beverage, etc.)

OSIsoft is Committed to the Nuclear Energy Industry

- Chris Crosby -- 33+ Years Nuclear Energy and Utility Experience
  - 20 years at Duke Energy -- Nuclear Scientist
  - 5+ years: at Various Technology Consulting and Services Companies
  - 5 years: at Life Cycle Engineering -- Operational and Reliability Excellence
  - 3 years: at OSIsoft -- Global Nuclear Energy Principal
- Keith Pierce -- 33+ Years Nuclear Energy and PI System Consultant and Architect
  - 10 years at APS Palo Verde Nuclear Station -- Digital Systems Engineer
  - 10 years at PSE&G Salem and Hope Creek -- IT Architect
  - 13 years+ Various Technology Consulting and Utility Companies, Including OSIsoft -- Solutions Architect; Center of Excellence Engineer
- Pablo Benvenuto -- 21+ Years Nuclear Energy, US NRC Inspector and Learning Experience
  - 2 years as a software specialist
  - 9 years in the US Nuclear Navy -- Nuclear Instructor and Engineer Duty Officer
  - 3.5 years at US Nuclear Regulatory Commission -- Resident Inspector
  - 1 year at Arizona Public Service Palo Verde NPP -- Nuclear Engineer
  - 6 years at OSIsoft as Learning Lead

Nuclear Power - The Safety View

"*We need to work together -- both domestically and internationally -- to reduce the potential for another accident…I believe industry should consider international cooperation and essential component of ensuring nuclear safety*."

by

Allison Macfarlane, NRC Chairman

PI System Overview

Highly scalable and secure real-time event infrastructure that connects people and systems with the right operational information at the right time — in order to **analyze, collaborate,** and **make smart decisions.**

Making Nuclear Energy Safer with the PI System

- Situational Awareness
- Operational Excellence
- Reliability Excellence
- Emergency Preparedness, Planning and Response
- Licensing/Life Extensions
- Software Security
- Partnering with Cyber Security Solutions Providers
- Supporting All Segments of Fuel Cycle, Including Waste Processing
- Advanced Reactor Designs

OSIsoft Selected Nuclear Energy Experience

Reactors

- Global Operating - 175 of 435 (40%)
- USA - 79 of 104 (76%)
- Canada - 17 of 17
- United Kingdom - 17 of 18
- Korea - 23 of 23
- China - 18 of 43
  - 10 of 17 (Operable)
  - 4 of 26 (Under Construction); 6 more (Under Construction) expected 2014

– KEPCO APR 1400 -- incorporated in Standard Design

– mPower -- Small Modular Reactor Test Facility

– Westinghouse AP1000 -- offered as firm option to current customers

– Russian VVER-TO -- proposed on standard design for Turkey and standardizing domestic reactors

Nuclear Fuel Cycle (examples)

23 Companies Outside Reactor Segment

- R&D -- Canadian Research
- Regulator -- US Nuclear Regulatory Commission (US NRC)
- Mining -- Cameco
- Fuel Processing and Fabrication -- Japan Nuclear Fuel, Westinghouse Nuclear Fuels, B&W Nuclear Fuels, Global Nuclear Fuels, Areva Melox
- Waste Processing -- Savannah River Nuclear Solutions, Washington River Protection Solutions (Hanford), Oak Ridge National Labs

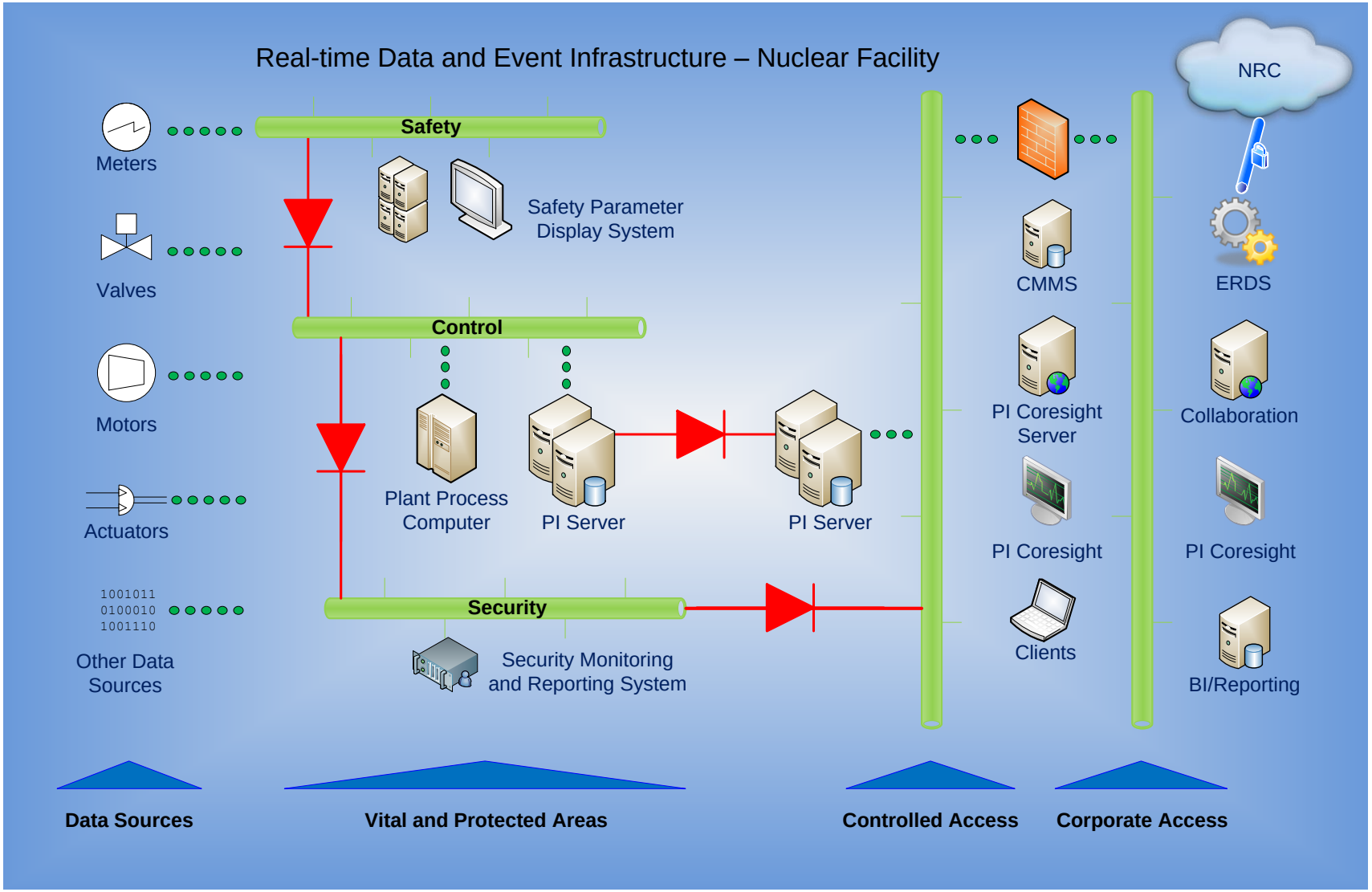
Representative Nuclear Use Cases

- System Engineer Desktop/System Monitoring and Reporting Tool (SMART)
- Equipment Reliability/Advance Performance Monitoring
- Safety Parameter Display System (SPDS)
- Used Fuel Pool Level Monitoring
- Environmental/Radiological Emissions Monitoring
- Emergency Preparedness, Planning & Response
- Cyber Security
- High Level Waste Processing

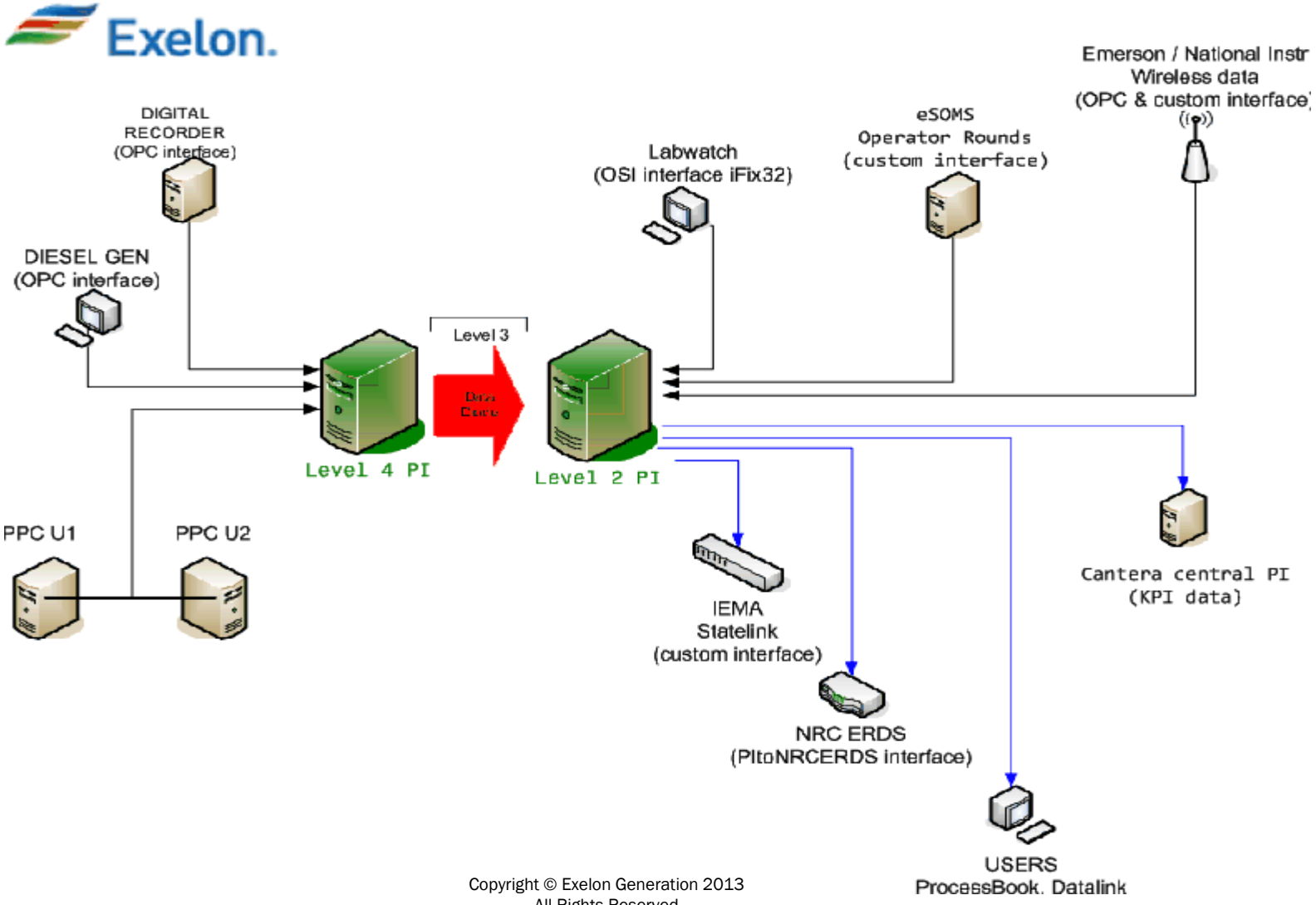
OSIsoft and PI System Security - OSIsoft "Gets" Security

- OSIsoft is **NOT** a compliance consulting or security solutions company, but we do "get" security…both software security and cybersecurity
- *In collaboration* with
  - Department of Homeland Security
  - Department of Energy Labs – Idaho National Lab (INL)
  - Microsoft (Security Development Lifecycle (SDL) and Security ACE team)
  - Many large, experienced customers
  - Infrastructure partners
- *Infrastructure partners* include
  - Intel/McAfee/Nitrosecurity (SIEM)
  - Waterfall Solutions (unidirectional gateways)
  - Owl (data diodes)
  - FoxIT (data diodes)

PI System Architecture – Nuclear Reference



PI System Architecture – Exelon Nuclear



OSIsoft and PI System Conclusion – Nuclear Industry

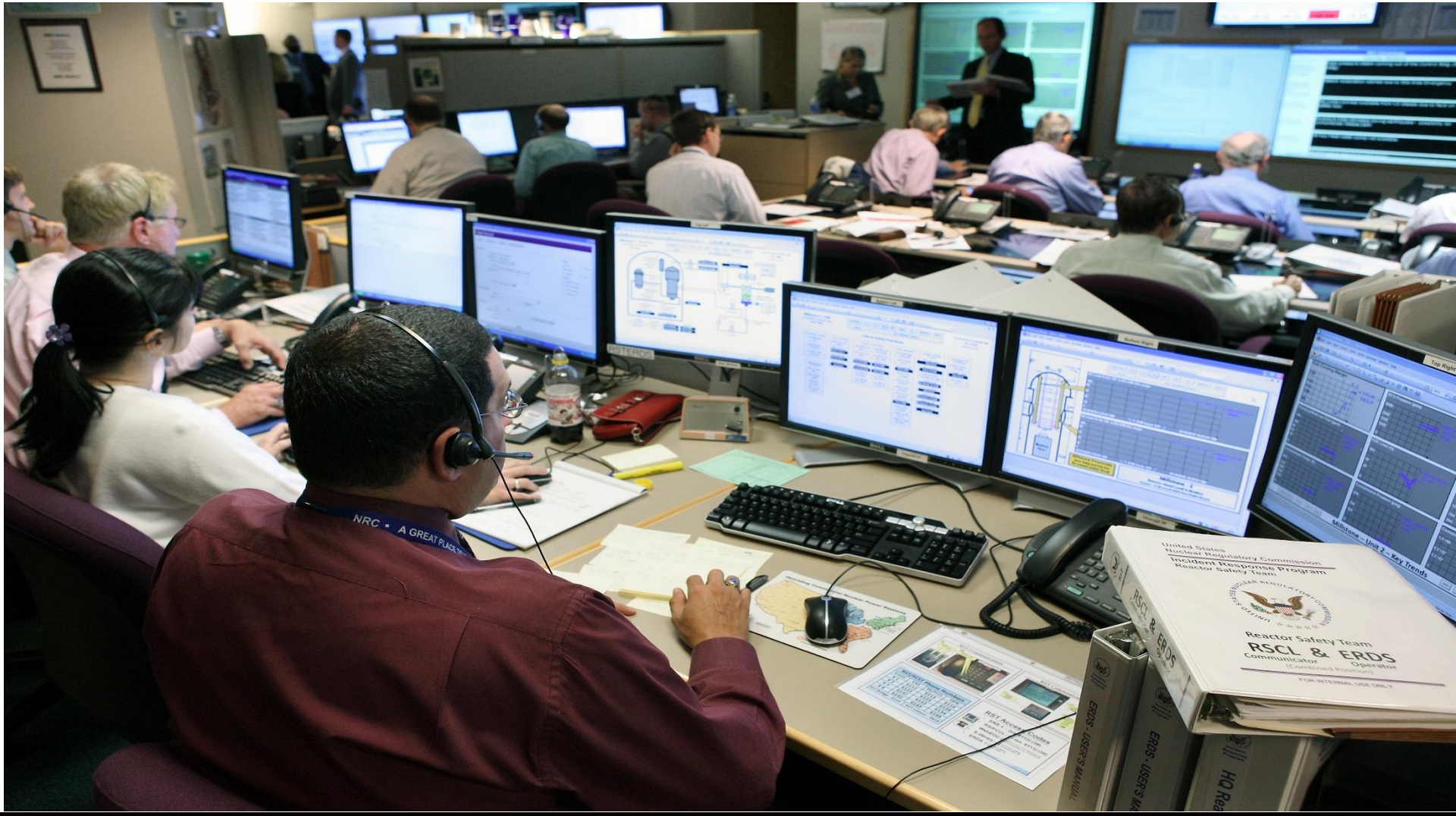
- OSIsoft and the PI System have earned its reputation as a trusted real-time infrastructure supplier to the global nuclear industry.
  - Over 40% of the operating reactors in the world use the PI System.
  - PI System is being considered as part of standard design for nearly all advanced reactors across the world.
  - Over 23 nuclear fuel cycle companies outside of the reactor segment use the PI System including the US nuclear regulator, Cameco, Westinghouse, Areva and US government high level nuclear waste processors.
- OSIsoft's continued investment in software security and cybersecurity provides significant advantages and enables safe, reliable and efficient nuclear operations.
- Sharing knowledge and best practices with the nuclear energy stakeholders globally is key to the nuclear industry's success.
- We understand that we are all in this together!

Back-up Slides

Typical Infrastructure and Application Benefits in Nuclear Energy

- Increase availability/decrease downtime
- Reduce loss and forced outages
- Reduce maintenance costs
- Optimize human capital
- Reduce in-plant energy/increase efficiency
- Reduce outage duration
- Reduce capital costs
- Support regulatory compliance
- Support life extension and license renewal
- Increased transparency to stakeholders
- Improve connectivity to supply chain and service providers

US NRC Incident Response Center (ERDS) – Millstone 2010 Drill



US NRC Incident Response Center (ERDS) – Watts Bar 2011 Drill

US NRC Incident Response Center (ERDS) – Comanche Peak